Tactical Information Broadcast Service (TIBS) Segment

User's Guide Version 2.1.4 for

GCCS Version 2.2

8 January 1997

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Section 1
Introduction

The Global Command and Control (GCCS) Tactical Information Broadcast Service (TIBS) Segment provides the ability for GCCS to participate in the TIBS Network in the following modes: receive-only, transmit-only, or two-way. The TIBS Segment consists of the following components: an interface, encoders/decoders, and the supporting user interface. The interface communicates with the TIBS Interface Unit/Commanders' Tactical Terminal (TIU/CTT). It decodes incoming data from messages in Tactical Data Intercomputer Message Format (TDIMF) and encodes outgoing data into TDIMF messages. The TIBS Segment resides on top of existing software on one or more nodes of a GCCS local area network (LAN). Interface to TIBS capabilities is achieved through several options on the GCCS menu. During TIBS operation, complete GCCS functionality is preserved.

The interface to the TIBS TIU is an asynchronous RS232 interface, with the following parameters: 4800 baud, 8 bit words, 1 stopbit, and no flow control. Most TIBS data (e.g., position data, ELINT data, and TBM data) can be mapped to existing GCCS databases. Additionally, the TIBS Segment can broadcast TBM data along with the associated impact point.

This user's guide applies to Version 2.1.4 of the TIBS software. This section discusses the system configuration, installation, start-up, and operation of TIBS. Section 2 discusses the TIBS data format, and Section 3 provides instructions on using specific TIBS options.

1.1 System Configuration

The TIBS configuration includes a SPARC® computer running Solaris™ Version 2.3 and/or a Tactical Advanced Computer (TAC) running HP-UX™ Version 9.0.7. The computer(s) must be installed with GCCS Version 2.2, TIBS Segment Version 2.1.4, and TIBS Secret Data Segment Version 2.1.4.

1.2 Installation

The TIBS Segment is normally installed on a GCCS workstation designated for TIBS encoding and decoding. The TIBS Segment is in standard GCCS segment format. For instructions on installing a GCCS segment, see the *Unified Build 3.0.1.6G System Administrator's Guide* for GCCS Version 2.2.

Note: In order for TIBS to encode and decode TDIMF messages, the TIBS Secret Data Segment must also be installed.

1.3 Start-up

TIBS is activated by starting GCCS in the standard manner. When GCCS has completed start-up, the GCCS tactical display appears.

1.4 Operating Notes

TIBS windows resemble GCCS windows in appearance as well as operating methods. For example, some TIBS windows have a pop-up menu that includes all options available in that particular window. These windows provide two choices for activating certain options. You may either click a labeled button in the window, or you may select the option of the same name from the window's pop-up menu.

All figures in this manual are designed to resemble on-screen graphics as closely as possible. Figure dimensions do not necessarily match the dimensions of actual windows, and window fields contain *example* data. All figures should be used for reference purposes only.

This manual frequently refers to selecting one or more items from a list in a window before performing an operation on the item(s). Select the desired item(s) as follows:

◆ For a single item, click the item once.

◆ For multiple items, either click each item individually or click one item and drag the pointer over a group of items.

◆ For all items, use the SELECT ALL option, if present, on the window's pop-up menu.

This user's guide is intended as a TIBS supplement to the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2. For instructions on using standard window features such as checkboxes, close boxes, and edit fields, see the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2. Please note that certain TIBS functions currently under development may not yet be fully documented herein.

Section 2

Data Format

The TIBS interface is designed to communicate with a TIBS Interface Unit/Commanders' Tactical Terminal (TIU/CTT). This intermediate device handles the encoding of the asynchronous serial data (i.e., TDIMF data) from a client (i.e., GCCS) to the synchronous 70 bit format that is broadcast over the radio. Similarly, the TIU/CTT takes the incoming synchronous format data from radio and serves it to the client node in the asynchronous serial TDIMF data format.

Data is sent to and from the TIU/CTT in the TDIMF data packet format as described below:

Byte	Description	Value(s)
1	Start of Message	0x1
2	Sequence Number	0xA9
3-4	Checksum	0-65535
5-6	Packet Length	n+5 (where n <= 3063)
7	Network Type ID	0-255
8	RF Channel	1,2
9	Data Byte 1	0-255
10	Data Byte 2	0-255
.	.	.
.	.	.
n+8	Data Byte n	0-255
n+9	Pass/Fail Flag	'P','F',0

Messages reside in the data bytes described above. A data packet may contain several messages. Each message is composed of one or more contiguous message blocks. The first byte of a message block is the unique block identifier. The second byte of a message block is the block length.

The following blocks are defined in the TDIMF Rev B specification:

Block Name	Block ID
ELEMENT ID BLOCK	0x10
ORIGINATOR ID BLOCK	0x11
ELEMENT AUXILLARY BLOCK	0x14
GENERAL BLOCK 1	0x20
GENERAL BLOCK 2	0x21
GENERAL BLOCK 3	0x22
GENERAL BLOCK 4	0x23
TRACK BLOCK 1	0x30
TRACK BLOCK 2	0x31
TRACK BLOCK 3	0x32
TRACK BLOCK 4	0x33
TRACK BLOCK 5	0x34
TRACK BLOCK 6	0x35
TRACK BLOCK 7	0x36
TRACK BLOCK 8	0x37
TRACK BLOCK 9	0x38
PARAMETER BLOCK 1	0x40
PARAMETER BLOCK 2	0x41
PARAMETER BLOCK 3	0x42
AMPLIFICATION BLOCK 1	0x50
AMPLIFICATION BLOCK 2	0x51
AMPLIFICATION BLOCK 3	0x52
AMPLIFICATION BLOCK 4	0x53
CHAINING BLOCK	0x60
REPORT RESPONSIBILITY BLOCK	0x70
QUERY TEXT BLOCK	0x80
TRAP TADIXS B TEXT BLOCK	0x90

For the TIBS interface, classified datafiles have been constructed that describe the data format of each of these blocks. The datafiles are organized with the block name followed by the suffix .db (database). For example, the Element ID Block is described in the file: elem_id_blk.db. In addition, data format files have been created for the internal track structure representations inside of GCCS (e.g., ub_rpt.db). A final set of datafiles with the .map suffix (e.g., elem_id_blk.map) maps the data from the TDIMF format to GCCS data elements. The mapping datafiles for reception describe how to take the fields from a given TIBS data format and map them to a given GCCS data format. Similarly, the mapping datafiles for transmission describe how to take the fields from a given GCCS data format and map them to a given TIBS data format. The logic to accomplish these mappings in this generic manner is one of the distinguishing aspects of this interface.

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Section 3

Operation

TIBS operates on top of existing GCCS software and uses many of the available GCCS options to deliver data to the TIBS user interface. The track database, tactical display, and other features of the GCCS software interact with TIBS data to allow classified data packets to be processed into tracks and TBM data to be broadcast as it becomes available to the TIBS interface.

Once a TIBS interface has been created by adding a TIBS channel, TIBS classified data packets will be processed through the encoder/decoder. The TIBS raw data window provides a method to view the TIBS packets being processed. TIBS EDIT windows may be viewed for Link and ELINT tracks, which are selected using conventional GCCS track-selection methods. Tracks may be deleted from the system using the track deletion process in GCCS.

This section is divided into the following subsections:

TIBS Interface
> To create and configure a TIBS comms channel. (Section 3.1)

TIBS Raw Data Window
> To view the two-way exchange of data over the TIBS comms channel. (Section 3.2)

TIBS Edit Window
> To view the TIBS EDIT window for a Link or ELINT track. (Section 3.3)

TIBS Track Delete
> To delete a TIBS track from the system. (Section 3.4)

3.1 TIBS Interface

The TIBS interface consists of two distinct pieces:

◆ The I/O module
◆ The Encoder/Decoder module

The I/O module consists of the code to configure a serial interface and to send and receive TDIMF data packets. The window used to add or modify the TIBS interface is similar to other GCCS comms configuration windows (e.g., OTCIXS). The TIBS interface can be configured for receive only, transmit only, or receive/transmit. The Encoder/Decoder module is where the TIBS data packets are processed. This module contains the logic for reading in the secret data definition and mapping files and either applying them to the stream of incoming data or using them to create the stream of outgoing data. A significant portion of the TIBS data can be mapped to the GCCS track database, including position data, ELINT data, and TBM data.

To use the TIBS interface, you must create and configure a TIBS comms channel.

<u>To create a TIBS comms channel</u>:

1. From the GCCS COMMS pull-down menu, select COMMUNICATIONS. The COMMUNICATIONS window appears.

2. Click ADD. The ADD CHANNEL window appears.

3. Enter the name and cross-reference code for the channel (as described in the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2).

4. Select the TIBS interface from the INTERFACE box.

5. Click OK. The COMMUNICATIONS window reappears, displaying the new TIBS channel.

<u>To configure a TIBS comms channel</u>:

1. To configure the TIBS comms channel, either double-click the TIBS channel in the COMMUNICATIONS window, or click it once and then click the EDIT button. The COMMS EDIT window for the channel appears.

Figure 3.1-1 COMMS EDIT Window

The NAME, XREF, and INTERFACE fields in this window are for viewing purposes only. The remaining fields display the default settings for the TIBS interface.

2. In the RU field in the COMMS EDIT window, enter the reporting unit number used by the TIBS interface when broadcasting data. This field will accept any number between 0 and 255.

3. The DECODER and ENCODER fields in the COMMS EDIT window allow for the customization of the TIBS interface for the type of data it will receive and/or transmit.

   a. Click the list box preceding the DECODER field to view a list of valid decoders that may be used by the TIBS interface when processing incoming messages. Select an entry from the list.

  b. Click the list box preceding the ENCODER field to view a list of valid encoders that may be used by the TIBS interface when processing outgoing messages. Select an entry from the list. Note that if the TibsBdcst encoder is selected, the system will automatically broadcast GCCS track data in a TIBS data format. You *must* select the TibsBdcst encoder in order for the system to use the filter designated in the FILTER field for the broadcast.

4. Note that the default value in the FILTER field is the last saved selection. If you have never saved a selection before, the default value in FILTER field is NONE, indicating that the system will broadcast all track data. You may specify that the system use a filter when broadcasting track data as follows:

  a. In the COMMS EDIT window (Figure 3.1-1) for the TIBS channel, click the list box preceding the FILTER field. If a list of valid filters appears, proceed to Step d. However, if no entries appear, proceed to Step b to add a filter.

  b. From the GCCS TRACKS pull-down menu, select SEARCH FILTER TABLE. The SELECT SEARCH FILTER window appears.
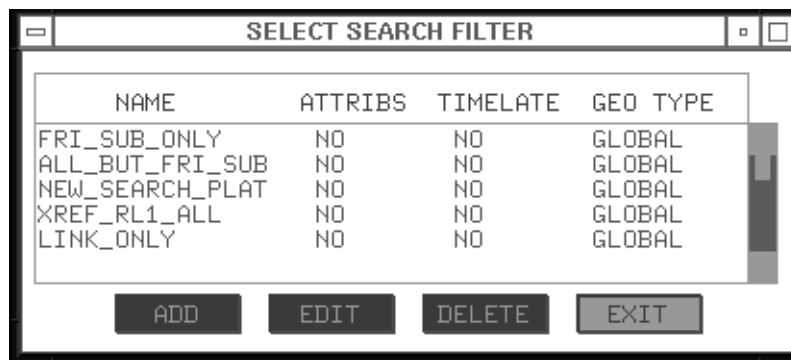

Figure 3.1-2 SELECT SEARCH FILTER Window

  c. Add one or more filters to the search filter database as described in the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2.

  d. Select a filter from the list. When the next broadcast occurs, the system will broadcast only those tracks that meet the selected filter's criteria.

5. In the CYCLE RATE field, enter the interval (in seconds) that should occur between each TIBS broadcast. If the CYCLE RATE = 0, the system will broadcast each event as it occurs.

6. In the SOURCE field, click A, B, C, or D, to specify the Link source into which the data coming over the interface is injected.

7. For a description of the remaining fields in the COMMS EDIT window, see the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2.

3.2 TIBS Raw Data Window

To view the two-way exchange of data over the TIBS comms channel:

1. From the list in the COMMUNICATIONS window, select the TIBS channel (described in the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2).

2. From the COMMUNICATIONS pop-up menu, select WINDOW. The TIBS raw data window appears. This window contains INPUT STREAM and OUTPUT STREAM boxes that allow you to view the data currently being received and transmitted by the system. The INPUT STREAM and OUTPUT STREAM boxes function as follows:

    ◆ For each incoming message, the INPUT STREAM box indicates the track type, as well as each message block that was processed to generate the track, as follows:

    PROCESSING {TRACK, ELINT, or TBM} : <block number> <block number>, etc.

    If the following PROCESSING DELETE message appears, it indicates that a track has been deleted by the TIBS Network and will be dropped from GCCS:

    PROCESSING DELETE : <block number> <block number>, etc.

    Note that a TIMEOUT OCCURRED - PARTIAL MESSAGE statement in the INPUT STREAM box indicates that only part of the message or message block was received, and the entire packet was not processed. This will usually occur if the interface to GCCS is severed or terminated mid-message.

    ◆ For each outgoing message, the OUTPUT STREAM box indicates the track type, as well as each message block that was included to generate the track, as follows:

    BROADCASTING {PLATFORM_UPDATE, LINK, or LINK CEC TBM} : <block number> <block number>, etc.

    If the following BROADCASTING DELETE message appears, it indicates that a track that has been deleted by GCCS is being broadcast to be deleted on the TIBS Network:

    BROADCASTING DELETE : <block number> <block number>, etc.

    If the following BROADCASTING LINK CEC PAIR message appears, it indicates that a TBM track is transmitting positional data of the projected impact point for a TBM track:

    BROADCASTING LINK CEC PAIR : <block number> <block number>, etc.

3. Use the options in the TIBS raw data window as follows:

   a. To "freeze" the flow of data in a specific box, click PAUSE beneath it. The data flow pauses, and the button label changes to CONTINUE. Note that a scroll bar appears in the window, allowing you to scroll backwards through previously displayed data.

   b. To resume the flow of data in a specific box, click CONTINUE beneath it. The data flow resumes, and the button label changes back to PAUSE.

To exit the TIBS raw data window, click EXIT.

3.3 TIBS Edit Window

To view the TIBS EDIT window for a Link or ELINT track:

Select a track either by double-clicking the track's symbol on the tactical display or by using the DATABASE SEARCH option on the UB TRACKS menu (as described in the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2). The TIBS EDIT window appears, displaying the track number for the selected track in the title bar. The data that appears in the TIBS EDIT window varies for Link and ELINT tracks. For an illustration of Link track data, see Figure 3.3-1. For an illustration of ELINT track data, see Figure 3.3-2.

Figure 3.3-1 TIBS EDIT Window (Link Track)

Link Tracks

Figure 3.3-1 provides an example of the TIBS EDIT window for a Link track. The information presented in this window is for viewing purposes only and cannot be edited.

The EDIT window contains the following boxes of data: TRACK NUMBERS, ATTRIBUTES, LAST REPORT, and REMARKS.

The TRACK NUMBERS box displays the various track numbers assigned to the track:

LTN
Local TIBS track number, used internally by the system for track identification.

STN
System track number, also known as the Naval Tactical Display System (NTDS) track number.

PARENT
If the track is associated with a Platform track, the local track number of the Platform track appears in this field.

UID
Unique identifier. Begins with three letters representing the site that reported the track, followed by a series of numbers to identify the track.

The ATTRIBUTES box contains information that was received via the TIBS interface:

SHORT NAME
Abbreviated track name.

TIBS NUM
Identification number unique to TIBS.

CATEGORY
Category code for the track:

    AIR -- Aircraft
    NAV -- Naval
    SUB -- Submarine
    MER -- Merchant
    FSH -- Fishing Vessel
    LND -- Land Unit
    UNK -- Unknown

THREAT
Threat status code for the track:

    FRI -- Friendly
    HOS -- Hostile
    NEU -- Neutral
    UAF -- Unknown Assumed Friendly
    UAE -- Unknown Assumed Enemy
    UEV -- Unknown Evaluated
    UNK -- Unknown
    PND -- Pending

FLAG
Two-character country code representing the nationality of the track. Each flag entry also has an associated threat code.

PU/RU

Reporting unit or the number for the TIBS system reporting that track.

TQ

Track quality number. This number (between 1 and 7) represents the quality of the track reported in the Link.

The LAST REPORT box contains information about the position of the track at the time of last report:

TIMELATE

Amount of elapsed time (in hours and minutes) since the latest report.

RPT DTG

Date-time group for the last reported position.

POSITION

Latitude and longitude of the last reported position.

CSE/SPD

Course for the track (in degrees true), followed by the speed of the track (in knots).

ALT/DEPTH

Altitude or depth (in feet) of the track. A negative number appears if the track is a submarine.

AOU TYPE

Type of Area Of Uncertainty (AOU); either ELLIPSE, LOB, or BBOX.

BRG

AOU bearing in degrees true.

SMJR/SMNR (Ellipse AOU only)

Semi-major axis length, followed by the semi-minor axis length of the ellipse.

SENSOR

Sensor type used to pick up the track at its last reported position.

SOURCE

Two-letter OTCIXS station source code (for example, AM=America).   Letters are taken from the Source XREF Table, which can be viewed using the SOURCE XREF TABLE option on the MISC menu.

XREF

Two-character source cross-reference code for the command that originated the track report.

AVE SPD (For editing tracks only.)

Average speed for a track. A value is automatically entered into this field when a motion model is selected. This field cannot be edited.

AVE TOL (For editing tracks only)

Average time on leg for a track. A value is automatically entered into this field when a motion model is selected. This field cannot be edited.

The REMARKS box contains free-form remarks about the track.

ELINT Tracks

Figure 3.3-2 provides an example of the EDIT window for an ELINT track. The information presented in this window may be edited.

Figure 3.3-2 EDIT Window (ELINT Track)

The pop-up options available for ELINT tracks in the EDIT window are described in the *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2.

The EDIT window contains the following boxes of data: TRACK NUMBERS, RTN, ATTRIBUTES, ELINT STATS, LAST REPORT, and LAST RAD. Note that most of the fields in the TRACK NUMBERS and LAST REPORT boxes are the same as those for a Link track (discussed above).

The RTN box contains information from the REMARKS field (accessed using the RECEIVE REMARKS pop-up option):

RTN
Remote track number.

COMMAND
Command name; always displays TIBS.

The ATTRIBUTES box contains information that was received via the TIBS interface:

ELNOT
ELINT notation. This five digit field begins with an alpha character, followed by three numbers, ending with another alpha character.

EMITTER NAME
Radar name (e.g., RAY1500, SPN-43, HEADNET).

SHORT NAME
Abbreviated track name.

FLAG
Two-character country code representing the nationality of the track. Each flag entry also has an associated threat code.

BE #
Basic Encyclopedia number, used for land emitters.

SCONUM
Ship Control Number. Assigned by NOIC (Naval Ocean Information Center); sometimes referred to as the NOIC ID or NOSICID.

ALERT
A track may be designated as a non-alert track (leave field blank) or an alert track (enter the proper alert classification).

CATEGORY
Category code for the track:

> AIR -- Aircraft
> NAV -- Naval
> SUB -- Submarine
> MER -- Merchant
> FSH -- Fishing Vessel
> LND -- Land Unit
> UNK -- Unknown

THREAT
> Threat status code for the track:

> FRI -- Friendly
> HOS -- Hostile
> NEU -- Neutral
> UAF -- Unknown Assumed Friendly
> UAE -- Unknown Assumed Enemy
> UEV -- Unknown Evaluated
> UNK -- Unknown
> PND -- Pending

The ELINT STATS box contains basebanded averages for the received ELINT reports:

PRI AVG
> Mean value for all reported Pulse Repetition Intervals (PRI).

PRI TOL
> Standard deviation for the PRI.

NUM PRI
> Number of PRIs used for these statistics. Generally, there is one PRI value for every report and this field contains the same number as the NUM RPTS field in the ATTRIBUTES box.

SCAN AVG
> Mean value for all reported scan rates.

SCAN TOL
> Standard deviation for the scan rate.

NUM SCAN
> Number of scan rates that are used for these statistics. This number is less than or equal to the number in the NUM PRI field.

RF AVG
> Mean value for all reported radio frequency values.

RF TOL
> Standard deviation for the radio frequency.

NUM RF
> Number of radio frequency values that are used for these statistics. This number is less than or equal to the number in the NUM PRI field.

The LAST REPORT box contains the same fields as listed above for Link tracks, with the following exception:

MOTION MODEL (For editing tracks)
Used only with MTST (for example, with the TRACK HISTORY ANALYSIS option). When a motion model is chosen, values are automatically placed in the AVE SPD and AVE TOL fields.

The LAST RAD box contains information about the most recent ELINT report received for the track. The LAST RAD and LAST REPORT box each contain information from the same report:

TIMELATE
Amount of elapsed time (in hours and minutes) since the latest report.

RAD DTG
Date-time group for the ELINT report.

BB PRI
Basebanded PRI for this report.

PRI
Pulse Repetition Interval (PRI), measured in microseconds.

BB SCAN
Basebanded scan rate for this report.

SCAN RATE
Scan rate, measured in seconds per rotation (SPR).

PRF
Pulse Repetition Frequency (PRF), measured in pulses per second; the reciprocal of the PRI value.

RF
Radio Frequency, measured in megahertz (MHZ).

PW
Pulse width, measured in microseconds.

CI
Correlation index.

ELNOT
ELINT Notation; the electronic emitter code assigned to a radar by the detecting sensor.

EMITTER
Radar name (e.g., RAY1500, SPN-43, HEADNET).

SCAN TYPE
Scan type code.

3.4 TIBS Track Delete

To delete a TIBS track from the system:

Select DELETE from the UB TRACKS pull-down menu. The SELECT TRACKS FOR DELETE window appears. This window functions just as it does in UB (as described in *Unified Build 3.0.1.6G User's Guide* for GCCS Version 2.2). TIBS tracks are identified in this window by the designation TIBS in the SENSOR column.